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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,315	08/29/2002	Edwin Young Call	32867W0031	7290

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EXAMINER
BAREFORD, KATHERINE A

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 05/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/089,315	CALL, EDWIN YOUNG	
	Examiner	Art Unit	
	Katherine A. Bareford	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2,4,6,7,9-21 and 23-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Claims 3, 5, 8, and 22 are canceled

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. In Response to the Decision on Appeal provided by the Board of Patent Appeals and Interferences of Feb. 28, 2006, where the Examiner's decision was affirmed-in-part and remanded to consider a rejection of claim 27, the following Office Action is provided.

Claims 1-2, 4, 6-7, 9-21, 23 and 25-26 remain rejected under 35 U.S.C. 103(a) as being unpatentable over "The Application of Zn-A1 Coatings to Prevent Corrosion of an Iron Boat" article (hereinafter Zn-Al article) in view of Hasui et al (US 5763015) for the reasons given in the rejection below, which rejection was affirmed by the Board of Appeals on Feb. 28, 2006.

Claims 1-2, 4, 6, 10, 13-18, 24 and 26 remain rejected under 35 U.S.C.103(a) as being unpatentable over Goldheim (US 3097932) in view of Hatfield (US 4578310) for the reasons given in the rejection below, which rejection was affirmed by the Board of Appeals on Feb. 28, 2006.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-2, 4, 6-7, 9-21, 23 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over "The Application of Zn-A1 Coatings to Prevent Corrosion of an Iron Boat" article (hereinafter Zn-Al article) in view of Hasui et al (US 5763015).

Zn-Al article teaches a method of protecting submerged or partially submerged marine surfaces, such as boat hulls. Pages 877 and 880. The protection method protects marine surfaces from bio-fouling without external electrical power. See page 878 ("corrosion test of sprayed coating" and "appearance" sections). The surface is directly metal sprayed with a zinc based alloy coating (Zn-Al) produced by a flame spraying (this would be a combustion wire spraying process, due to the "combustion" of gases to provide the flame for the flame spraying, by the operational definition of flame spraying) thermal spray process. See page 877 ("spraying" section [a Zn-Al wire is used] and figure 2, and it is noted that flame spraying is an example of a "thermal"

spraying process). This provides a protective coating of the zinc based alloy on the surface to provide protection to the surface. Pages 877 and 880.

Claim 2: the coating is free of tributyltin (it is described as 87 % Zn and 13 % Al, and thus has no other material). Page 877.

Claims 4 and 20: the substrate can be steel. Page 877.

Claim 7: Zn-A1 article teaches that the substrate is prepared for the flame spraying by degreasing, followed by blast cleaning with steel grit to remove rust and scale. Page 877.

Claim 10: a sealer on top of the flame sprayed, thermal spray coating is provided. Page 877.

Claims 11 and 19: Zn-Al article teaches that the coating can be 87% zinc, within the claims 50-100% range. Page 877.

Claims 12 and 19: Zn-Al article teaches that the coating can also contain aluminum. Page 877.

Claim 13: Zn-A1 article also teaches a method for cathodically protecting surfaces of submerged or partially submerged metallic marine structures by thermally spraying by flame spraying the surfaces with a zinc based alloy coating. Pages 877 and 880 and see page 878 "corrosion test of sprayed coating" section).

Claim 14: the structure can be a hull of a ship. Page 877.

Claims 15, 16, 18 and 23: a marine structure submerged or partially submerged in water having been coated as described above with regards to claim 1 or 13 is provided. See pages 877 and 880.

Zn-Al article teaches all the features of these claims except (1) the electric arc, twin wire spraying with one wire zinc and the other a zinc alloy (claims 1, 7, 13, 19), (2) the specific substrate used (claims 4, 6, 20, 21), (3) the specific washing and blasting process (claim 7), (4) the multiple layers of thermal spraying (claim 9), (5) that the amount of the zinc in the coating depends on the surfaces to be coated (claims 11, 19), and (6) the propeller substrate (claims 17, 25, 26).

However, Hasui teaches spraying a coating of zinc and aluminum onto a substrate. Column 1, lines 1-15. The applied coating can be used to protect a substrate against sea water. Column 1, lines 1-30. The spray coating can be formed on a substrate of steel, aluminum, zinc, a plastic, glass or wood. See column 2, lines 20-35. The substrate is spray coated using a two (twin) wire electric arc spraying system. Column 3, line 50 through column 4, lines 25 (this is a form of "thermal" spraying as electric arc, twin wire spraying is an exemplary form of "thermal" spraying). One wire can be zinc and the other wire an alloy of zinc and aluminum. Column 4, lines 5-25. The amount of zinc vs. aluminum in the spray coating is based on the particular purpose or material of the substrate. Column 4, lines 15-30. For a steel substrate, for example, the percentage of zinc can be 50-90 % . Column 4, lines 20-30. After the spraying of the zinc/aluminum coating, a sealing treatment is carried out on the coating. Column 4, lines 30-45.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify' Zn-Al article to (1) perform electric arc, twin wire thermal spraying with one wire zinc and the other a zinc alloy as suggested by Hasui in order to provide a desirable coated surface to be sealed for protection, because Zn-A1 article teaches protecting a marine article of iron based material by metal spraying a zinc alloy coating on the surface using a wire spraying process and then sealing the coating and Hasui teaches that a desirable way to protect a substrate from an environment such as sea water is by metal spraying using electric arc, twin wire spraying with one wire zinc and the other zinc/Al alloy and then sealing the coating. (2) It would further have been obvious to modify Zn-Al article to use a carbon steel or stainless steel substrate or a wood or plastic substrate as suggested by Hasui with an expectation of providing desirable protection to various surfaces, because Zn-A1 article teaches that the substrate is a steel substrate with no limitation on the specific steel used, and it is the Examiner's position that carbon steel and stainless steels are well known forms of steel known to one of ordinary skill in the art, which would thus be included as desirable surfaces to be protected, and further, Hasui teaches that it is desirable to protect wood and plastic substrates as well as steel substrates. (3) It would further have been obvious to modify Zn-A1 article in view of Hasui to wash with water to remove soluble materials and blast the surface to white metal before thermal spraying with an expectation of producing a desirable coated article, because Zn-Al article teaches degreasing and grit blasting to remove rust and scale before thermal

spraying, and it is the Examiner's position that it is well known in the art of degreasing and grit blasting before thermal spraying to degrease by washing in water to remove material on the substrate and to grit blast to white metal when removing rust and scale. (4) It would further have been obvious to modify Zn-A1 article in view of Hasui to spray multiple layers to achieve the desired coating thickness with an expectation of achieving a desirable coated product, because Zn-A1 article teaches spraying to a desired minimum thickness (see page 878, top of 2nd column, - it must be over 100 microns) and it is the Examiner's position that coating multiple layers (i.e. multiple passes of the spray gun) is well known in the thermal spraying art in order to achieve the desired build up of thickness into the desired range. (5) It would further have been obvious to modify Zn-A1 article to perform experimentation to optimize the amount of Zn in the coating based on the specific substrate to be used as suggested by Hasui so as to achieve the optimum final product protection, because Zn-Al article teaches a test of a specific example of Zn-Al, and further indicates (at page 880) that further investigation is to be performed, indicating the desire to optimize the specific coating used and Hasui teaches to select the amount of Zn in the coating based on the specific substrate to be used. (6) It would further have been obvious to modify Zn-Al article in view of Hasui to apply the coating system to a propeller so as to produce a protected propeller, because Zn-Al article teaches a coating to prevent corrosion and fouling on a submerged marine boat, and propellers would be a well known marine surface that

would be desirably protected from corrosion and fouling so as to prolong their useful economic life.

5. Claims 1-2, 4, 6, 10, 13-18, 24 and 26 are rejected under 35 U.S.C.103(a) as being unpatentable over Goldheim (US 3097932) in view of Hatfield (US 4578310).

Goldheim teaches a method of protecting submerged or partially submerged marine surfaces, such as boat hulls. Column 1, lines 5-15. The protection method protects marine surfaces from bio-fouling without external electrical power. Column 1, lines 5-15 and column 2, lines 5-35. The surface is directly sprayed with a zinc coating produced by a flame spraying (this would be either a combustion wire or powder process, due to the "combustion" of gases to provide the flame for the flame spraying, by the operational definition of flame spraying) thermal spray process. Figure 1 and column 1, lines 35-45 (the first layer of zinc is applied directly to the surface, and it is noted that flame spraying is an example of a "thermal" spraying process). This provides a protective coating of the zinc on the surface to provide protection to the surface. Figure 1 and column 2, lines 25-35.

Claim 2: the coating is free of tributyltin (it is all zinc). Column 1, lines 40-50.

Claim 4: Goldheim also teaches that the substrate can be steel. Column 1, lines 15-20.

Claim 6: the surface can be plastic or wood. Column 1, lines 15-20.

Claim 10: Goldheim teaches applying a sealer system on top of the thermal spray coating. Figures 2-3 and column 45-55.

Claim 13: Goldheim also teaches a method for cathodically protecting surfaces of submerged or partially submerged metallic marine structures by thermally spraying the surfaces with a zinc based coating. Column 1, lines 35-45 and column 2, lines 5-35 (the application of the zinc based coating).

Claim 14: the structure can be a hull of a ship. Column 1, lines 5-15.

Claims 15, 16 and 18: a marine structure submerged or partially submerged in water having been coated as described above with regards to claim 1 or 13 is provided. See column 1, lines 5-15 and column 2, lines 5-35.

Claim 24: the coating is 100 percent zinc. Column 1, lines 40-50.

Goldheim teaches all the features of these claims except (1) the electric arc, twin wire spraying with both wires of zinc (claims 1, 13), (2) the specific steel substrate (claim 4), and (3) the propeller (claims 17, 26).

However, Hatfield teaches that when applying a metal film of a material such as zinc, it is well known to use a twin wire electric arc spraying system, where two continuously fed zinc wires arc and melt. Column 3, lines 5-20 (this is a form of "thermal" spraying, as electric arc, twin wire spraying is an exemplary form of "thermal" spraying). As well, such zinc coatings can also be applied by flame spraying. Column 3, lines 5-20 (this is another form of "thermal" spraying, as flame spraying is also an exemplary form of "thermal" spraying).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) modify Goldheim to use electric arc twin wire spraying with both wires of zinc as suggested by Hatfield with an expectation of producing a desirable protected coated article, because Goldheim teaches flame spraying a zinc coating, and Hatfield teaches that when applying zinc coatings, either flame spraying or twin wire arc spraying with both wires of zinc are desirable application methods. (2) It would further have been obvious to modify Goldheim in view of Hatfield to use a carbon steel or stainless steel substrate with an expectation of producing a desirable coated article, because Goldheim teaches that the substrate can be a steel substrate with no limitation on the specific steel used, and it is the Examiner's position that carbon steel and stainless steels are well known forms of steel known to one of ordinary skill in the art, and thus carbon and stainless steels would be included as desirable surfaces to be protected. (3) It would further have been obvious to modify Goldheim in view of Hatfield to apply the coating system to a propeller so as to produce a protected propeller, because Goldheim teaches a coating to prevent fouling of various marine surfaces (see column 1, lines 5-15), and propellers would be a well known marine surface that would be desirable to protect from fouling so as to prolong their useful economic life.

6. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goldheim in view of Hatfield as applied to claims 1-2, 4, 6, 10, 13-18, 24 and 26 above, and further in view of Hasui et al (US 5763015).

Goldheim in view of Hatfield teaches all the features of this claim except that in the arc spraying process the first wire is zinc and the second wire is a zinc-copper alloy. Goldheim does teach that antifouling coatings can be made from zinc, copper, stainless steel, chromium, etc. Column 1, lines 40-46.

Hasui teaches spraying a coating of zinc and aluminum onto a substrate. Column 1, lines 1-15. The applied coating can be used to protect a substrate against sea water. Column 1, lines 1-30. The spray coating can be formed on a substrate of steel, aluminum, zinc, a plastic, glass or wood. See column 2, lines 20-35. The substrate is spray coated using a two (twin) wire electric arc spraying system. Column 3, line 50 through column 4, lines 25 (this is a form of "thermal" spraying as electric arc, twin wire spraying is an exemplary form of "thermal" spraying). One wire can be zinc and the other wire an alloy of zinc and aluminum. Column 4, lines 5-25.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Goldheim in view of Hatfield to use electric arc twin wire spraying with one wire of zinc and the other wire of zinc-copper alloy as suggested by Hasui with an expectation of producing a desirable protected coated article, because Goldheim in view of Hatfield provides applying a zinc coating by a method such as twin wire arc spraying to provide an antifouling coating and further

provides that metals such as copper also provide desirable antifouling, and Hasui teaches that a desirable way to protect a substrate from an environment such as sea water is by metal spraying using electric arc, twin wire spraying with one wire zinc and the other zinc/Al alloy, which provides the suggestion that when twin wire arc spraying a two material coating, with one material being zinc, it would be suggested to provide one wire of zinc and the other wire an alloy of zinc-metal, which in this case would be zinc-copper due to the suggestion of using copper as well as zinc as taught by Goldheim.

7. Claims 1 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Thermal Spraying: New Construction and Maintenance" article (hereinafter New Construction article) in view of Hasui et al (US 5763015).

New Construction article teaches a method of protecting submerged or partially submerged marine surfaces from bio-fouling. Page 5-8 (the described coating prevents biofouling of submerged surfaces by zebra mussels). Coatings such as zinc and/or copper are taught to be applied to the surface to be protected by thermal spraying. Page 5-8. The protection occurs without external electrical power (as the organism senses the leaching of the zinc and copper). Page 5-8. New Construction article also teaches that coatings of zinc and zinc-aluminum alloy can be used to protect the surface. Page 5-8. Electric arc, twin wire spraying is taught to be a conventional thermal spray method for applying zinc alloys. Pages 2-4, 2-6 and figure 2-6.

New Construction article teaches all the features of these claims except that the surface is directly sprayed using arc spraying where one wire is zinc and the other is zinc-metal (copper, aluminum).

However, Hasui teaches spraying a coating of zinc and aluminum onto a substrate. Column 1, lines 1-15. The applied coating can be used to protect a substrate against sea water. Column 1, lines 1-30. The spray coating can be formed on a substrate of steel, aluminum, zinc, a plastic, glass or wood. See column 2, lines 20-35. The coating can be applied directly to the substrate. Column 2, lines 35-45 (while a primer coating is preferred, it is not required). The substrate is spray coated using a two (twin) wire electric arc spraying system. Column 3, line 50 through column 4, lines 25 (this is a form of "thermal" spraying as electric arc, twin wire spraying is an exemplary form of "thermal" spraying). One wire can be zinc and the other wire an alloy of zinc and aluminum. Column 4, lines 5-25. The amount of zinc vs. aluminum in the spray coating is based on the particular purpose or material of the substrate. Column 4, lines 15-30. For a steel substrate, for example, the percentage of zinc can be 50-90 % . Column 4, lines 20-30. After the spraying of the zinc/aluminum coating, a sealing treatment is carried out on the coating. Column 4, lines 30-45.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify New Construction article to perform electric arc, twin wire thermal spraying with one wire zinc and the other a zinc alloy (zinc-aluminum or zinc-copper) directly on a substrate as suggested by Hasui in order to provide a

desirable coated surface to be sealed for protection, because New Construction article teaches protecting a marine article by thermal spraying a zinc alloy coating on the surface using a process such as electric arc, twin wire thermal spraying, where the alloy can be zinc-copper or zinc-aluminum and Hasui teaches that a desirable way to protect a substrate from an environment such as sea water is by metal spraying using electric arc, twin wire spraying with one wire zinc and the other zinc/Al alloy directly on the surface and then sealing the coating. This provides the suggestion that when twin wire arc spraying a two material coating, with one material being zinc, it would be suggested to provide one wire of zinc and the other wire an alloy of zinc-metal, which in this case would be zinc-aluminum (claim 1) or zinc-copper (claim 1, 27) due to the suggestion of using copper or aluminum alloys of the zinc as taught by New Construction article.

8. Japan 02-274861 also teaches to use zinc-copper thermally sprayed coatings on marine surfaces to prevent fouling. See the abstract.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers

for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KATHERINE BAREFORD
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